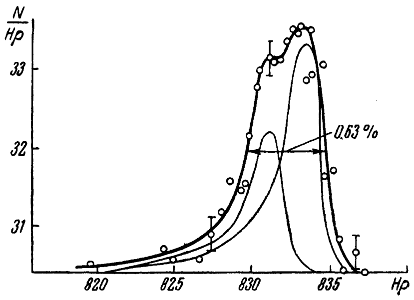
served in the Ce^{144} spectrum near 58 kev has been interpreted as either K-100 or M-59. The L line of the 100-kev transition has not been separated, since it is located near the K-134 line, which is the most intense one in the spectrum; this made the presence of this transition doubtful.

We investigated the conversion spectrum of Ce^{144} with the aid of a spiral beta spectrometer having a resolution of 0.25%.



The diagram shows the 57.7-kev conversion line. The shape of this line and the fact that its half-width (0.63%) is greater than the single lines of this spectrum* make it obvious that this is a complex line. A graphical resolution of this line yielded two components with energies 57.76 and 57.45 kev. These energy values are in good agreement with the energy values of K-100 and M-59 and confirm the presence of both transitions. We also resolved the L_1-100 line, with $E_e = 92.83$ kev. According to our data, a more exact value of the energy of the 100-kev transition is 99.7 ± 0.1 kev. From the ratio of the areas under the K and the L_1 lines we obtain a ratio $\alpha_K/\alpha_{L_1} = 3.3 \pm 0.8$ kev for the ratio of the conversion coefficient of this transition. The possible contribution of the M-95 line has been estimated by us and is included in the error. The value obtained for the ratio of the conversion coefficients corresponds to an M3 transition.[5,6]

*The 38-kev K-80 line has a half-width of 0.38%.

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[3] Hickok, McKinley, and Fultz, Phys. Rev. **109**, 113 (1958).

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CONCERNING THE Ce^{141} *DECAY SCHEME*

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We have measured the γ-γ and e^--γ coincidences to improve the accuracy of the decay scheme[1-5,7,8] of Ce^{144}.

The γ-γ coincidences were measured with a scintillation coincidence spectrometer.[6] Figure 1 shows the singles spectrum for Ce^{144} and the coincidence spectrum for γ rays in the 80-kev region. Peaks corresponding to x-rays from Pr^{144} and to γ-rays with an energy ~ 53 kev were visible in the coincidence spectrum. The peak at ~ 46 kev in the coincidence spectrum corresponds to Compton electrons from 134-kev γ rays and is due to the scattering of quanta from crystal to crystal. When the analyzer window is set at the 134-kev peak, the coincidence spectrum has no noticeable peaks up to 80 kev. To determine the upper limit for the intensity of the proposed 41 to 134 kev γ-γ cascade, comparative measurements were made for Ce^{144} and Sm^{153}. It was found that

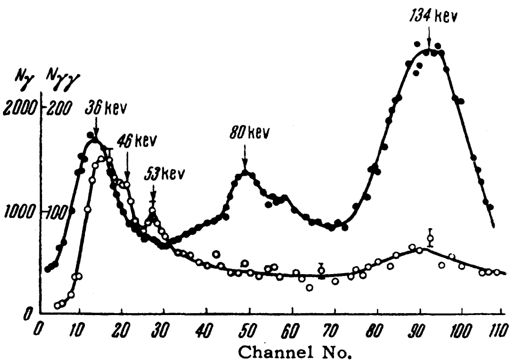

FIG. 1. ●) Singles γ-ray spectrum; ○) $\gamma-\gamma$ coincidence spectrum (with random coincidence background included).

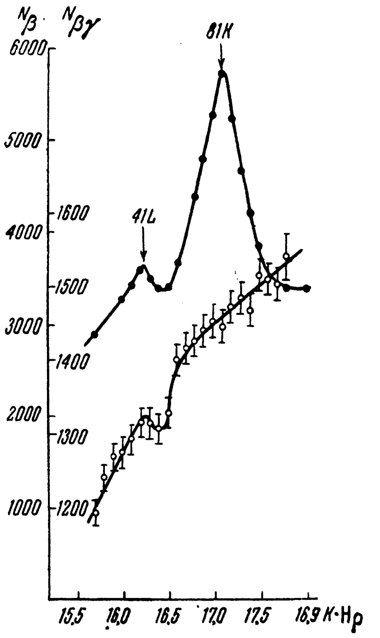

FIG. 2. •) β spectrum; o) $e^- - \gamma$ coincidence spectrum.

the intensity of the γ ray in cascade with the 134-kev line in Ce^{144} is less than 4×10^{-4} of that for the 134-kev transition. This value is defined by the statistical accuracy of the measurements. However, in a previous study,[7] we found an indication of a soft β spectrum with $E_\beta \simeq 130$ kev and we suggested that there may be a 41 to 134 kev cascade.

The absence of coincidences among the γ rays has prompted us to investigate coincidences of the 134-kev γ line with the 35-kev conversion line that had been observed in the primary β spectrum and that was identified as an L conversion transition of the 41-kev level. These coincidences were measured with a device described previously.[6,7] Figure 2 shows a portion of the coincidence spectrum which was obtained from one of a series of measurements. Also shown in Fig. 2 is the corresponding portion of the singles β spectrum. These data indicate that the 41L conversion line is in coincidence with the 134-kev γ line.

All these data are in agreement with a decay scheme which includes a 175-kev level.[2,4,7] In this case one must assume that the 41-kev transition undergoes practically total conversion. The values computed for the conversion coefficient in the L shell[9] show that for a multipolarity which is not less than E2, or even for E2 with an admixture of M1, the conversion coefficient is close to unity, and this is in complete agreement with the data from our measurements of γ-γ and e^--γ coincidences.

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THE ELASTIC SCATTERING OF POLARIZED DIRAC PARTICLES BY A SHORT RANGE CENTER OF FORCE IN THE DAMPING THEORY

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THE elastic scattering of Dirac particles by a fixed short range center of force including the effect of damping was investigated in references 1 and 2 (in the following we shall adhere to the notations of these papers). Reference 2 also took into account the polarization effects for the special case of scattering from a δ-function potential.

In the present note we consider the elastic scattering of Dirac particles by an arbitrary center of force with the inclusion of the polarization effects, using the damping theory. The solution of the fundamental integral equation of the damping theory is [cf. formula (28) of reference 2]